NLRP1 gene

NLR family pyrin domain containing 1

Normal Function

The *NLRP1* gene provides instructions for making a member of a family of proteins called nucleotide-binding domain and leucine-rich repeat containing (NLR) proteins. These proteins are involved in the immune system, helping to regulate the process of inflammation. Inflammation occurs when the immune system sends signaling molecules and white blood cells to a site of injury or disease to fight microbial invaders and facilitate tissue repair. The body then stops (inhibits) the inflammatory response to prevent damage to its own cells and tissues.

The NLRP1 protein is involved in the assembly of a molecular complex called an inflammasome, which helps trigger the inflammatory process in response to the presence of bacteria or viruses. Researchers believe that the NLRP1 protein may also play a role in the self-destruction of cells (apoptosis).

Health Conditions Related to Genetic Changes

autoimmune Addison disease

vitiligo

Studies have associated variations in the *NLRP1* gene with an increased risk of vitiligo, an autoimmune condition that results in patchy changes in skin coloring (pigmentation).

One of the *NLRP1* gene variations associated with vitiligo changes the protein building block (amino acid) leucine to the amino acid histidine at position 155 in the NLRP1 protein sequence, written as Leu155His or L155H. This and other variations likely affect the activity of the NLRP1 protein, making it more difficult for the body to control inflammation and prevent the immune system from attacking its own tissues. While the pigment loss associated with vitiligo results from the immune system attacking pigment-producing cells (melanocytes) in the skin, it is unclear what specific circumstances trigger the immune system to do so. The condition probably results from a combination of genetic and environmental factors, most of which have not been identified.

autoimmune disorders

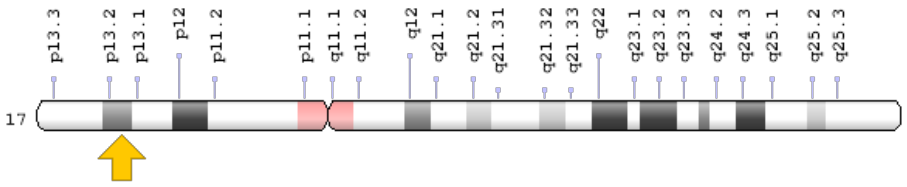
NLRP1 gene variations have been associated with an increased risk of autoimmune disorders. Autoimmune disorders occur when the immune system malfunctions and

attacks the body's tissues and organs. These disorders include type 1 diabetes, in which insulin-producing cells in the pancreas are destroyed, and Addison disease, which is caused by autoimmune damage to the small hormone-producing glands on top of each kidney (adrenal glands). Certain *NLRP1* gene variations seem to make affected individuals more prone to overactivity of the immune system, resulting in damage to the body's own tissues and organs.

Chromosomal Location

Cytogenetic Location: 17p13.2, which is the short (p) arm of chromosome 17 at position 13.2

Molecular Location: base pairs 5,501,399 to 5,584,512 on chromosome 17 (Homo sapiens Annotation Release 108, GRCh38.p7) (NCBI)



Credit: Genome Decoration Page/NCBI

Other Names for This Gene

- CARD7
- CLR17.1
- DEFCAP
- DKFZp586O1822
- KIAA0926
- NAC
- NALP1
- NALP1_HUMAN
- NLR family, pyrin domain containing 1
- SLEV1
- VAMAS1

Additional Information & Resources

Educational Resources

- National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS): Scientists Implicate Gene in Vitiligo and Other Autoimmune Diseases
  https://www.niams.nih.gov/News_and_Events/Press_Releases/2007/04_10.asp

Scientific Articles on PubMed

- PubMed
  https://www.ncbi.nlm.nih.gov/pubmed?term=%28NLRP1%5BTIAB%5D%29+OR+%28%28CARD7%5BTIAB%5D%29+OR+%28NALP1%5BTIAB%5D%29+OR+%28SLEV1%5BTIAB%5D%29+OR+%28DEFCAP%5BTIAB%5D%29%29+AND+%28%28Genes%5BMH%5D%29+OR+%28Genetic+Phenomena%5BMH%5D%29%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+360+days%22%5Bdp%5D

OMIM

- NLR FAMILY, PYRIN DOMAIN-CONTAINING 1
  http://omim.org/entry/606636

Research Resources

- Atlas of Genetics and Cytogenetics in Oncology and Haematology
  http://atlasgeneticsoncology.org/Genes/GC_NLRP1.html
- ClinVar
  https://www.ncbi.nlm.nih.gov/clinvar?term=NLRP1%5Bgene%5D
- HGNC Gene Family: Caspase recruitment domain containing
  http://www.genenames.org/cgi-bin/genefamilies/set/959
- HGNC Gene Family: NLR family
  http://www.genenames.org/cgi-bin/genefamilies/set/666
- HGNC Gene Family: Pyrin domain containing
  http://www.genenames.org/cgi-bin/genefamilies/set/994
- HGNC Gene Symbol Report
  http://www.genenames.org/cgi-bin/gene_symbol_report?q=data/hgnc_data.php&hgnc_id=14374
- NCBI Gene
  https://www.ncbi.nlm.nih.gov/gene/22861
- UniProt
  http://www.uniprot.org/uniprot/Q9C000

Sources for This Summary

- Jin Y, Birlea SA, Fain PR, Spritz RA. Genetic variations in NALP1 are associated with generalized vitiligo in a Romanian population. J Invest Dermatol. 2007 Nov;127(11):2558-62. Epub 2007 Jul 19.
  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/17637824
- Jin Y, Mailloux CM, Gowan K, Riccardi SL, LaBerge G, Bennett DC, Fain PR, Spritz RA. NALP1 in vitiligo-associated multiple autoimmune disease. N Engl J Med. 2007 Mar 22;356(12):1216-25.
  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/17377159
- Jin Y, Riccardi SL, Gowan K, Fain PR, Spritz RA. Fine-mapping of vitiligo susceptibility loci on chromosomes 7 and 9 and interactions with NLRP1 (NALP1). J Invest Dermatol. 2010 Mar;130(3): 774-83. doi: 10.1038/jid.2009.273. Epub 2009 Sep 3.
  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/19727120
  Free article on PubMed Central: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3513759/
- OMIM: NLR FAMILY, PYRIN DOMAIN-CONTAINING 1
  http://omim.org/entry/606636
- Pontillo A, Brandao L, Guimaraes R, Segat L, Araujo J, Crovella S. Two SNPs in NLRP3 gene are involved in the predisposition to type-1 diabetes and celiac disease in a pediatric population from northeast Brazil. Autoimmunity. 2010 Dec;43(8):583-9. doi: 10.3109/08916930903540432. Epub 2010 Apr 7.
  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/20370570
- Smith AG, Sturm RA. Multiple genes and locus interactions in susceptibility to vitiligo. J Invest Dermatol. 2010 Mar;130(3):643-5. doi: 10.1038/jid.2009.403.
  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/20145641
- Spritz RA. The genetics of generalized vitiligo and associated autoimmune diseases. Pigment Cell Res. 2007 Aug;20(4):271-8. Review.
  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/17630960
- Taïeb A. NALP1 and the inflammasomes: challenging our perception of vitiligo and vitiligo-related autoimmune disorders. Pigment Cell Res. 2007 Aug;20(4):260-2.
  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/17630958
- Zurawek M, Fichna M, Januszkiewicz-Lewandowska D, Gryczynska M, Fichna P, Nowak J. A coding variant in NLRP1 is associated with autoimmune Addison's disease. Hum Immunol. 2010 May;71(5):530-4. doi: 10.1016/j.humimm.2010.02.004. Epub 2010 Mar 1.
  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/20152874

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